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(54) REMOTE CONTROL SYSTEM SUITABLE FOR A VEHICLE AND HAVING REMOTE TRANSMITTER VERIFICATION

MIT FERNBEDIENUNGS-ECHTHEITSPRÜFUNG VERSEHENES FERNBEDIENUNGSSYSTEM
FÜR FAHRZEUGE

SYSTEME DE TELECOMMANDE DESTINE A UN VEHICULE ET DOTE D'UNE CAPACITE DE
VERIFICATION D'UN TELE-EMETTEUR

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Description**Field of the Invention**

[0001] The present invention relates to the field of remote control systems, and more particularly, to a remote control system, such as for vehicle security.

Background of the Invention

[0002] Vehicle security systems are widely used to deter vehicle theft, prevent theft of valuables from a vehicle, deter vandalism, and to protect vehicle owners and occupants. A typical automobile security system, for example, includes a central processor or controller connected to a plurality of vehicle sensors. The sensors, for example, may detect opening of the trunk, hood, doors, windows, and also movement of the vehicle or within the vehicle. Ultrasonic and microwave motion detectors, vibration sensors, sound discriminators, differential pressure sensors, and switches may be used as sensors. In addition, radar sensors may be used to monitor the area proximate the vehicle.

[0003] The controller typically operates to give an alarm indication in the event of triggering of a vehicle sensor. The alarm indication may typically be a flashing of the lights and/or the sounding of the vehicle horn or a siren. In addition, the vehicle fuel supply and/or ignition power may be selectively disabled based upon an alarm condition.

[0004] A typical security system also includes a receiver associated with the controller that cooperates with one or more remote transmitters typically carried by the user as disclosed, for example, in U.S-A-4,383,242. The remote transmitter may be used to arm and disarm the vehicle security system or provide other remote control features from a predetermined range away from the vehicle.

[0005] As disclosed in U.S-A-5,049,867 and 5,146,215, the security system controller may include features to store and compare unique codes associated with a plurality of remote transmitters, each remote transmitter having its own unique code initially programmed therein. U.S-A-5,146,215 in particular discloses that remote transmitter codes may be added or deleted from the controller corresponding to the number of remote transmitters desired by the user. Unfortunately, a would-be thief gaining access to the controller may readily enter the program or learn mode and install the code of an unauthorized remote transmitter. The owner would thus be unaware of such activity, until the thief returns with the unauthorized remote transmitter to disarm the security system and steal the vehicle, or steal the vehicle contents.

[0006] Also related to remote control of a vehicle function U.S-A-5,252,966 discloses a remote keyless entry system for a vehicle. The keyless entry system permits the user to remotely open the vehicle doors or open the

vehicle trunk using a small handheld transmitter. The system provides a thirty second time window in which to operate one or more uniquely coded remote transmitters to load the transmitter codes into memory. If someone desired to surreptitiously record a new transmitter code into someone else's receiver, the new code would overwrite the prior codes so that only the new code would remain. If the authorized transmitter ceased to operate, the user may recognize that the receiver had been the subject of tampering. Unfortunately, the user may also simply assume that the battery in his remote transmitter had failed and would be unaware that a new transmitter had been coded into the system without his knowledge.

[0007] Remote vehicle starting systems also typically include uniquely coded remote transmitters capable of remotely starting the vehicle engine, and wherein the transmitter codes may be learned into the system. Other remote control systems for a vehicle operate similarly, and are subject to tampering or bypassing by one gaining access to the controller to record a different unauthorized transmitter code. Unfortunately, the user may be completely unaware that a new transmitter has been coded and may operate the remote control system, until, for example, a thief returns with a coded remote transmitter, disarms the security system and steals the vehicle.

[0008] US-A-5,365,225 discloses a transmitter-receiver system for a vehicle security system which permits the manufacturer or user of the system to re-initialize the system, that is, learn new transmitter codes to operate the system. In particular, the user may carry out a certain measure, such as inserting the ignition key and turning the key to a certain position to permit re-initialization. The receiver briefly actuates the mechanism, for example, a motor vehicle central locking system, in a perceptible way as acknowledgement that the code has been received. The receiver may also include a light which flashes to show that all fragments of an original code have been received from the transmitter during re-initialization. Unfortunately, the brief actuation of the locking system or flashing light is only perceptible during the re-initialization and would serve no purpose to advise the vehicle owner that a remote transmitter has been surreptitiously learned into the vehicle security system when the owner was away from the vehicle.

Summary of the Invention

[0009] In view of the foregoing background, it is an object of the invention to provide a vehicle security system and related method for reducing the risk of an unauthorized remote transmitter being able to disarm the vehicle security system. It is another object to provide a similar enhanced security feature to the remote control of other functions associated with a vehicle, such as, keyless door entry and remote engine starting.

[0010] The present invention consists in a remote

control system for a vehicle for permitting a user to remotely control a function associated with the vehicle, comprising at least one uniquely coded remote transmitter; a receiver within the vehicle for receiving a signal from said at least one uniquely coded remote transmitter; remote transmitter learning means operatively connected to said receiver for learning a unique code of a remote transmitter during a temporarily entered learning mode to define a learned remote transmitter capable of causing performance of a function associated with the vehicle; remote transmitter verifying means for generating an indication relating to whether a new uniquely coded remote transmitter has been learned by the remote transmitter learning means, said remote transmitter verifying means comprising indicating means for generating the indication relating to whether a new uniquely coded remote transmitter (50) has been learned by the remote transmitter learning means, and activating means for causing said remote transmitter verifying means to generate the indication; characterised in that said remote transmitter verifying means is adapted to generate the indication as to whether a new remote transmitter has been learned by the remote transmitter learning means at a predetermined time after the temporarily entered learning mode has been exited.

[0011] The remote control system is used, in one embodiment, for a vehicle security system. In particular, the security system preferably includes at least one vehicle security sensor and an alarm controller switchable between an armed mode and a disarmed mode responsive to a learned remote transmitter. The alarm controller in the disarmed mode is capable of generating an alarm responsive to a vehicle security sensor. If a remote transmitter were learned without authorization, the would-be criminal could return to the vehicle, disarm the security system and steal the vehicle. The present invention provides the user with a verification that only authorized remote transmitters can disarm the security system, and conversely that no unauthorized remote transmitters have been learned.

[0012] The remote control system may also be used for a remote keyless door entry system including a plurality of vehicle door locks movable between locked and unlocked positions, and a door lock controller for moving the vehicle door locks between locked and unlocked positions responsive to a learned remote transmitter. If the user is made aware of the possibility that an unauthorized remote transmitter has been learned into the remote keyless entry system, the user can take steps to delete the learned remote transmitters and relearn only authorized remote transmitters.

[0013] Similarly, the remote control system may also be used for a remote engine starting system. In particular, such an embodiment preferably includes a vehicle engine starter, and a remote start controller for operating the vehicle engine starter responsive to a learned remote transmitter. Again the user would be alerted by the remote transmitter verifying means to the possibility of

an unauthorized remote transmitter being capable of remote starting the vehicle.

[0014] The remote transmitter learning means is preferably switchable between a learning mode permitting learning of a unique code of a remote transmitter, and a secure mode. The remote transmitter learning means also preferably includes remote transmitter deleting means for deleting all prior learned remote transmitters based upon entering the learning mode. If all the remote transmitters are deleted, the user can be assured that only authorized transmitters have been coded or learned thereafter.

[0015] In one embodiment, the remote transmitter verifying means comprises learning mode entered indicating means for indicating that the learning mode of the remote transmitter learning means has been entered. More particularly, the learning mode entered indicating means preferably comprises time lapse means for indicating when the learning mode of the remote transmitter learning means has last been entered. This indication can be provided by progressively indicating a passage of time or the elapsed time since the learning mode has last been entered.

[0016] According to another approach or embodiment 25 of the invention, the remote transmitter verifying means preferably comprises learned remote transmitter number indicating means for indicating a number of learned remote transmitters. Alternatively, the remote transmitter verifying means may comprise learned remote transmitter change indicating means for indicating a change in a number of learned remote transmitters. In yet another embodiment, the remote transmitter verifying means preferably comprises learned remote transmitter code change indicating means for indicating a change in a unique code of learned remote transmitters. In each variation, the user is alerted to the possibility of an unauthorized transmitter having been learned.

[0017] The verifying means preferably comprises indicating means for generating an indication relating to 40 whether a new uniquely coded remote transmitter has been learned by the remote transmitter learning means. The indicating means may be vehicle indicating means associated with the vehicle, or remote indicating means remotely positioned from the vehicle. The indicating means may be provided by at least one of a light, a visual display, a vibration transducer, a speech message generator, and an audible signal generator.

[0018] Yet another aspect of the present invention is 45 that the verifying means may include activating means for causing the indicating means to generate an indication responsive to a manually operated switch at the vehicle or remote therefrom, or a vehicle sensor, such as associated with the vehicle doors or ignition switch, for example. The activating means may also be provided by a remote transmitter having one or more switches operated in a predetermined sequence, for example.

[0019] The present invention also consists in a method 55 for increasing security in permitting remote control of

function associated with a vehicle using at least one uniquely coded remote transmitter, and a receiver within the vehicle for receiving a signal from the at least one uniquely coded remote transmitter, comprising the step of storing in a memory a unique code of a remote transmitter during a temporarily entered learning mode to define a learned remote transmitter capable of causing performance of a function associated with the vehicle; the method being characterized by the step of verifying whether a new uniquely coded remote transmitter has been stored in the memory by activating generation of an indication relating to whether a new uniquely coded remote transmitter has been stored in the memory a pre-determined time after the temporarily entered learning mode has been exited thereby to alert the user of a potentially unauthorized learned remote transmitter capable of remotely performing a function associated with the vehicle.

[0020] Another aspect of the present invention relates to remote transmitter verification for providing increased security for a remote opening door, such as a garage door, for example. In particular, the remote control system for opening the door preferably comprises at least one uniquely coded remote transmitter, and a receiver associated with the door for receiving a signal from the at least one uniquely coded remote transmitter. A door controller is preferably provided for moving the door between open and closed positions. Remote transmitter learning means, operatively connected to the receiver, is preferably provided for learning a unique code of a remote transmitter to define a learned remote transmitter capable of causing the door controller to move the door to the open position. In addition, the system preferably includes remote transmitter verifying means for generating an indication relating to whether a new uniquely coded remote transmitter has been learned by the remote transmitter learning means.

Brief Description of the Drawings

[0021] FIG. 1 is a schematic block diagram of the vehicle security system according to the invention.

[0022] FIG. 2 is a schematic diagram of a remote transmitter for the vehicle security system according to the invention.

[0023] FIG. 3 is a schematic diagram of a remote control vehicle security system according to the present invention.

[0024] FIG. 4 is a schematic diagram of a remote control system for vehicle keyless entry according to the invention.

[0025] FIG. 5 is a schematic diagram of a remote vehicle engine starting system according to the present invention.

[0026] FIG. 6 is a schematic diagram of a remote control door opening system according to the invention.

[0027] FIGS. 7 and 8 are flow charts illustrating examples of remote transmitter verification according to

the invention.

Detailed Description of the Preferred Embodiments

5 **[0028]** Referring to the schematic block diagram of FIG. 1, a vehicle security system 10 according to one aspect of the invention is first described. The security system includes a controller 11 which, in turn, in the illustrated embodiment, includes a central processing unit or microprocessor 12 operating under stored program control.

[0029] In the illustrated embodiment, a transmitter and receiver 13 are connected to the microprocessor 12 for receiving signals from a remote transmitter and for transmitting signals to a remote unit, as will be described in greater detail below. As would be readily understood by those skilled in the art, the transmitter portion of the controller 11 may not be needed in some embodiments of the invention. An antenna 13a is illustratively connected to the transmitter and receiver 13.

[0030] In the illustrated embodiment, the microprocessor is also operatively connected to a memory (EEPROM) 14 and an input interface 15 and an output interface 16. As would be readily understood by those skilled in the art, the microprocessor 12 may alternatively or additionally have its own on-board memory.

[0031] The input interface 15 is illustratively connected to various vehicle input devices including: an ignition switch 20; a key in the ignition sensor 21; two zone sensors 22a, 22b; conventional trunk hood and door pin sensors or switches 23, 24, and 25, respectively; and door lock switches 28. In addition, a pre-warn sensor 26 and valet switch 27 also provide inputs to the controller 11 in the illustrated embodiment. As would be readily understood by those skilled in the art, other inputs are also contemplated by the present invention and are generally described herein by the term sensor. In addition, an input signal may also be received from a remote transmitter 50 (FIG. 2).

[0032] The output interface 16 of the controller 11 may preferably be connected to a plurality of output devices. As shown in FIG. 1, the outputs may include auxiliary relay outputs 30, such as for window control, remote starting, or a remote alarm indication, as would be readily understood by those skilled in the art. A siren and/or lights 31, and green and red light emitting diodes (LEDs) 32, 33 for dashboard mounting are also illustratively connected to the controller 11. Other outputs may be directed to a valet LED 34, a dome light 36, a central lock relay or lock control unit 41, a starter kill circuit 42, and an armed relay output 43. In addition, other outputs may be directed to one or more of an audible tone generator 37, an alphanumeric display 44, a speech message annunciator 45, and a vibration transducer 46, as will be readily appreciated by those skilled in the art. Other similar indicating devices are also contemplated by the present invention, as would be readily understood by those skilled in the art.

[0033] Referring now more particularly to FIG. 2, a remote transmitter 50 in accordance with the invention is described. The remote transmitter 50 includes a housing 51 and a plurality of first momentary contact switches 52a-52d carried by the housing. A second momentary contact switch 53 and an indicating light, such as the illustrated LED 54 are also carried by or mounted on the housing 51. As would be readily understood by those skilled in the art, the remote transmitter 50 is typically relatively small and includes an opening 55 for facilitating connection to a vehicle key ring, for example. In addition, the remote transmitter 50 includes a central processing unit or microprocessor 56 operatively connected to the plurality of first switches 52a-52d, the second switch 53, and the LED 54. The microprocessor is also connected to a transmitter and/or receiver circuit 57 and its associated antenna 57a for transmitting and/or receiving signals to and from the controller 11 of the vehicle security system 10. Accordingly, the term "remote transmitter" is used broadly herein to describe the embodiment also including receiver means.

[0034] The remote transmitter 50 may also include a numeric or alphanumeric display 58, and a speaker 59 coupled to an audible tone generator or a speech message generator, as may be provided by the microprocessor 56. A vibration transducer, not shown, may also be incorporated into the remote transmitter 50 for communicating to the user as would be readily understood by those skilled in the art.

[0035] The controller 11 preferably includes remote transmitter learning means 47 for permitting the addition or learning of a coded remote transmitter 50 to be capable of switching the controller between armed and disarmed modes, for example. In the armed mode the controller 11 is capable of generating an alarm via alarm indication means, such as the siren and/or flashing lights 31. The controller 11 generates the alarm responsive to at least one of the vehicle sensors, such as the trunk, hood and door switches 23, 24 and 25, or the other sensors 22a, 22b as would be readily understood by those skilled in the art. In the disarmed mode the controller 11 does not generate an alarm responsive to one or more of the vehicle sensors so that the user may enter the vehicle, for example.

[0036] The controller 11 preferably comprises remote transmitter verifying means 49 for generating an indication relating to whether a new uniquely coded remote transmitter has been learned by the remote transmitter learning means 47. In addition, the remote transmitter learning means 47 is preferably switchable between a learning or program mode permitting learning of a unique code of a remote transmitter 50, and a secure mode. As would be readily understood by those skilled in the art, the learning mode may be entered for a relatively short predetermined time and then automatically revert back to the secure mode to reduce the possibility of unauthorized remote transmitters being learned.

[0037] In one embodiment, the remote transmitter

verifying means 49 comprises learning mode entered indicating means for indicating that the learning mode of the remote transmitter learning means has been entered. More particularly, the learning mode entered indicating means preferably comprises time lapse means for indicating when the learning mode of the remote transmitter learning means has last been entered. This indication can be provided by progressively indicating the elapsed time since the learning mode has last been entered.

[0038] According to another approach or embodiment of the invention, the remote transmitter verifying means 49 preferably comprises learned remote transmitter number indicating means for indicating a number of learned remote transmitters. In an embodiment where all remote transmitters are deleted when a new one is learned, the number of learned transmitters may change indicating that an unauthorized transmitter has been learned. Alternately, the remote transmitter verifying means 49 may comprise learned remote transmitter change indicating means for directly indicating a change in a number of learned remote transmitters. In yet another embodiment, the remote transmitter verifying means 49 preferably comprises learned remote transmitter code change indicating means for indicating a change in a unique code of the learned remote transmitters.

[0039] The remote transmitter verifying means 49 preferably includes remote transmitter indicating means for providing the indication. In other words, indicating means, such as a dashboard mounted light emitting diode 32, 33, may be flashed a number of times corresponding to the number of coded remote transmitters in one embodiment. Accordingly, the user is ensured that only the coded remote transmitters 50 under his control may operate the vehicle security system 10, and that no other remote transmitters have been surreptitiously coded to operate the controller.

[0040] Other embodiments of remote transmitter indicating means include, for example, the audible tone generator 37, numeric display 44, speech message generator 45 and vibration transducer 46 driven by the controller and associated with the vehicle. The dome light 36, headlights 31, and other LED's 32, 33 and 34 may also be used to give an indication to the user relating to the remote transmitters coded to operate the controller 11.

[0041] The remote transmitter indicating means may also be associated with or carried by a remote transmitter 50, or may be otherwise remote from the vehicle and be communicated to the remote site via a satellite or cellular telephone connection. For example, the indication means may be provided by a light 54, an alphanumeric display 58, a speech or tone generator 59, and a vibration transducer, for example, carried by the remote transmitter 50 (FIG. 2).

Alternatively, a remote monitoring station may be provided to monitor one or a plurality of vehicles in cooper-

ation with the transmitter verifying means of each respective vehicle. In addition, a pager may be carried by the user to provide the indication.

[0042] The indication given to the user may preferably be the number of coded remote transmitters currently capable of switching the controller 11 to the disarmed mode from the armed mode. Alternatively, the indication may be related to a change in the number of coded remote transmitters or a change in a code of a learned remote transmitter. The various indicating means and remote transmitter verifying means may also be used to simply alert the user that the learning mode has been recently entered. Accordingly, the remote transmitter verifying means 49 provides an indication relating to whether one or more remote transmitters has been added or learned without the owner's consent or knowledge. The indicating means may also further comprise repeater means for repeating an indication relating to the number of coded transmitters 50 for a predetermined time period or a predetermined number of repetitions.

[0043] Should the user determine that an unauthorized remote transmitter has been added or learned to operate the controller 11, the controller also preferably includes remote transmitter deleting means 48 for permitting deletion of the newly added unauthorized remote transmitter or all of the coded remote transmitters 50 capable of switching the controller between the armed and disarmed modes. In one embodiment, the deleting means preferably comprises means for deleting all of the previously learned remote transmitters. All of the previously learned remote transmitters may be deleted based upon entering the learning mode, that is, either when the learning mode is initially entered or when the first remote transmitter is learned, for example. If all of the coded remote transmitters are deleted by the deleting means 48, the authorized transmitters may thereafter be added by the remote transmitter learning means 47 as would be readily understood by those skilled in the art.

[0044] The vehicle security system 10 also preferably includes activating means for activating the remote transmitter indicating means responsive to a predetermined condition. For example, the indicating means may be triggered by the activating means responsive to operation of one of a signal from the remote transmitter 50; a manually operable switch, such as the valet switch 27; an ignition switch 20, including a key in the switch sensor 21; a door position switch 25; and a door lock switch 28. For example, the valet switch, ignition switch, remote transmitter buttons, or other manual switches could be operated in a predetermined sequence to activate the indicating means. Other similar means for activating the indicating means are also contemplated by the invention, and will be readily appreciated by those skilled in the art.

[0045] Referring now additionally to FIGS. 3-6, various embodiments of the transmitter verification feature of the present invention are further described. A vehicle

security system 10 is schematically illustrated in FIG. 3 including the controller 11 along with the siren 31 and door switches 25. The transmitter verifying means 49 is illustrated in a separate block for clarity, although those

5 of skill in the art will recognize that the logic features of the transmitter verifying means may be readily implemented via the microprocessor of the controller. Two illustrated remote transmitters 50 are capable of switching the controller 11 between armed and disarmed 10 modes. When in the armed mode, tripping of the vehicle door switches 25 may typically activate the siren 31. In addition, the door switches 25 may also be used as part of the activation means to cause the transmitter verifying means to give an indication relating to an unauthorized 15 remote transmitter.

[0046] Referring now more particularly to FIG. 4, a remote keyless entry (RKE) system 80 is illustrated as another example of the remote transmitter verification aspect of the present invention applied to a vehicle remote 20 control system. The RKE system 80 includes an RKE controller 81 which receives signals from one or more remote transmitters 85. The RKE controller 81 receives signals from the remote RKE transmitter 85 to either unlock the doors, via the illustrated power door lock motors 25 82, or open the trunk, via the trunk release 83 as would be readily understood by those skilled in the art. The illustrated RKE system 10 also includes remote transmitter verifying means 84 for generating an indication relating to an unauthorized transmitter being learned by 30 the controller 81, as described above.

[0047] A remote engine start system 90 is schematically illustrated in FIG. 5. The remote start system 90 illustratively includes a remote start controller 91 operatively connected to the engine starter 92 and the ignition system 93 of the vehicle to permit the user to remotely start the engine, such as to warm or cool the vehicle interior prior to entering the vehicle. The remote start system 90 also includes remote transmitter verifying means 94 to reduce the likelihood that someone

40 could learn an unauthorized remote transmitter 95 into the controller 91.

[0048] Yet another illustrative embodiment of a remote control system according to the invention is understood with particular reference to FIG. 6. The illustrated door opening system 100 includes a conventional overhead door opener 101, such as for a garage. The door opener 101, in turn, includes a motor and receiver/controller as would be readily understood by those skilled in the art. The illustrated segmented garage door 102 is guided by a pair of opposing tracks, not shown. The illustrated garage door opener system 100 includes a remote transmitter 105 for operating the door remotely. In other words, entry into the garage, and possibly an adjoining structure, is achieved via the uniquely coded remote transmitters 105 learned into the controller. Accordingly, the door opener system 100 preferably also includes remote transmitter verifying means 104 as described herein. Many other possible security/access ap-

plications including remote transmitter verification features are contemplated by the present invention and will be readily appreciated by those skilled in the art. For example, remote control system directed to operation of a vehicle climate control system or vehicle sliding doors may also benefit from remote transmitter verification.

[0049] A method aspect in accordance with the present invention is for increasing security in permitting remote control of a function associated with a vehicle and using at least one uniquely coded remote transmitter 50, and a receiver 13 within the vehicle for receiving a signal from the uniquely coded remote transmitter. The method preferably comprises the steps of: storing in a memory 14 a unique code of a remote transmitter 50 to define a learned remote transmitter capable of causing performance of a function associated with the vehicle, and generating an indication relating to whether a new uniquely coded remote transmitter has been stored in the memory to thereby alert the user of a potentially unauthorized learned remote transmitter capable of remotely performing the function associated with the vehicle.

[0050] A particular example of the transmitter verification feature of the present invention is explained with further reference to the flow chart of FIG. 7. In this example, the vehicle security system controller 11 (FIGS. 1 and 3) preferably includes ignition switch monitoring means 20 (FIG. 1) for determining whether a vehicle ignition switch is in an off position or an on position as monitored at Block 61 and when the controller is in the disarmed mode (Block 60). If the ignition is switched on (Block 63), the number of coded remote transmitters 50 (FIGS. 1-3) is determined or verified (Block 65). The controller 11 also preferably includes activating means for activating an LED 32, 33 (FIG. 1) to indicate the number of coded transmitters 50 at Block 67 responsive to turning the vehicle ignition to the on position and when the controller 11 is in the disarmed mode. The number of coded transmitters 50 may be repeated for a predetermined time, such as ten seconds, at Block 68. The verification feature is then stopped (Block 69). If unsure, the driver could turn the ignition off, and then back to the on position, to again verify the number of coded remote transmitters 50. Those of skill in the art will readily appreciate alternative embodiments incorporating other indicating means or activating means as described in greater detail herein.

[0051] Referring to the flow chart of FIG. 8, another variation of the invention is described. In the illustrated flow chart, operation of an RKE system 90 (FIG. 5) is explained, although those of skill in the art will recognize its applicability to the vehicle security system 10 and other remote control applications contemplated by the present invention. From the start (Block 110), the door position is monitored at Block 112. If a door, such as the driver's door, has been determined at Block 114 to have been opened and closed, it is next determined whether the remote transmitter learn mode has been entered or

a remote transmitter code changed at Block 116. If the door has not been opened and closed, or the learn mode or transmitter code not changed, the system returns to monitoring the door position at Block 112.

5 **[0052]** If the learn mode has been entered or the code changed, the elapsed time t since that event is compared against a threshold $T1$ at Block 118. If the elapsed time t is less than $T1$, then a first duration signal may be generated at Block 120. If the elapsed time t is between 10 $T1$ and a second threshold $T2$ as determined at Block 122, then a second duration indication can be generated (Block 124). Similarly, if the elapsed time t is between 15 $T2$ and a third threshold $T3$ as determined at Block 126, then a third duration indication may be given at Block 128. The sequence can be extended or shortened as would be readily appreciated by those skilled in the art. **[0053]** For example, if the learn mode has been entered within the prior forty-eight hours, an indicating light may be illuminated for a thirty second duration responsive to the activation means. The duration could thereafter be decremented five seconds for each 48 hours of elapsed time, so that the indication would eventually automatically terminate with the passage of sufficient time. As another example, the light could be illuminated for 20 ninety seconds the first day, and decrement ten seconds 25 each day thereafter. It is desirable that the indication inform the user of how recently the learn mode or transmitter change has been made so that the user may correlate the change with someone's ability to access the 30 RKE system 90, and/or to compare the timing with an authorized servicing or repair of the RKE system. An appropriate voice message could also be generated alerting the user to when the learning mode was last entered, for example.

Claims

1. A remote control system (10) for a vehicle for permitting a user to remotely control a function associated with the vehicle, comprising at least one uniquely coded remote transmitter (50); a receiver (13) within the vehicle for receiving a signal from said at least one uniquely coded remote transmitter; remote transmitter learning means (47) operatively connected to said receiver for learning a unique code of a remote transmitter during a temporarily entered learning mode to define a learned remote transmitter capable of causing performance of a function associated with the vehicle; remote transmitter verifying means (49) for generating an indication relating to whether a new uniquely coded remote transmitter (50) has been learned by the remote transmitter learning means (47), said remote transmitter verifying means comprising indicating means (30-37, 44-46) for generating the indication relating to whether a new uniquely coded remote transmitter (50) has been learned by the remote

transmitter learning means (47), and activating means (20, 21, 27) for causing said remote transmitter verifying means (49) to generate the indication; characterised in that said remote transmitter verifying means (49) is adapted to generate the indication as to whether a new remote transmitter (50) has been learned by the remote transmitter learning means (47) at a predetermined time after the temporarily entered learning mode has been exited.

2. A remote control system according to Claim 1 wherein said remote transmitter learning means (47) is switchable between a learning mode, permitting learning of a unique code of a remote transmitter, and a secure mode.

3. A remote control system according to Claim 2 wherein said remote transmitter learning means (47) comprises remote transmitter deleting means for deleting all prior learned remote transmitters based upon entering the learning mode.

4. A remote control system according to Claim 2 or 3 wherein said remote transmitter verifying means (49) comprises learning mode entered indicating means for indicating that the learning mode of said remote transmitter learning means has been entered.

5. A remote control system according to Claim 4 wherein said learning mode entered indicating means comprises time lapse means for indicating when the learning mode of said remote transmitter learning means has last been entered.

6. A remote control system according to Claim 5 wherein said time lapse means comprises means for progressively indicating a passage of time since the learning mode has last been entered.

7. A remote control system according to any preceding Claim, wherein said remote transmitter verifying means (49) comprises learned remote transmitter number indicating means for indicating a number of learned remote transmitters (50).

8. A remote control system according to any preceding Claim, wherein said remote transmitter verifying means (49) comprises learned remote transmitter change indicating means for indicating a change in a number of learned remote transmitters (50).

9. A remote control system according to any preceding Claim, wherein said remote transmitter verifying means comprises learned remote transmitter code change indicating means for indicating a change in a unique code of learned remote transmitters (50).

5 10. A remote control system according to any preceding Claim, wherein said indicating means comprises vehicle indicating means associated with the vehicle; and wherein said vehicle indicating means comprises at least one of a light (31, 36), a visual display (44), a vibration transducer (46), a speech message generator (45), and an audible signal generator (47).

10 11. A remote control system according to any preceding Claim, wherein said indicating means (50) comprises remote indicating means remotely positioned from the vehicle; and wherein said remote indicating means comprises at least one of a light (54), a visual display (58), a vibration transducer, a speech message generator (56, 59), and an audible signal generator (59).

15 12. A remote control system according to any preceding Claim, wherein said activating means comprises vehicle activating means associated with the vehicle; and wherein said vehicle activating means comprises at least one of a manually operated switch (20, 27), a vehicle switch (25), and a vehicle sensor (21).

20 13. A remote control system according to any preceding Claim, wherein said activating means comprises remote activating means remote from the vehicle; and wherein said remote activating means comprises a remote transmitter (50).

25 14. A remote control system according to any preceding Claim, including at least one vehicle security sensor (22a, 22b, 23-26); and an alarm controller (11) switchable between an armed mode and a disarmed mode responsive to a learned remote transmitter (50), said alarm controller in the disarmed mode being capable of generating an alarm responsive to the at least one vehicle security sensor.

30 15. A remote control system according to any preceding Claim, including a plurality of vehicle door locks (82) movable between locked and unlocked positions; and a door lock controller (81) for moving the vehicle door locks between locked and unlocked positions responsive to a learned remote transmitter (85).

35 16. A remote control system according to any preceding Claim, including a vehicle engine starter (92); and a remote start controller (91) for operating the vehicle engine starter responsive to a learned remote transmitter (95).

40 50 17. A method for increasing security in permitting remote control of function associated with a vehicle using at least one uniquely coded remote transmit-

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ter (50), and a receiver (13) within the vehicle for receiving a signal from the at least one uniquely coded remote transmitter, comprising the step of storing in a memory (14) a unique code of a remote transmitter during a temporarily entered learning mode to define a learned remote transmitter capable of causing performance of a function associated with the vehicle; the method being characterized by the step of verifying whether a new uniquely coded remote transmitter (50) has been stored in the memory (14) by activating generation of an indication relating to whether a new uniquely coded remote transmitter has been stored in the memory (14) a predetermined time after the temporarily entered learning mode has been exited thereby to alert the user of a potentially unauthorized learned remote transmitter capable of remotely performing a function associated with the vehicle.

18. A method according to Claim 17 wherein said memory (14) is switchable between a learning mode, permitting learning of a unique code of a remote transmitter (50), and a secure mode, and all prior learned remote transmitters are deleted based upon entering the learning mode.

19. A method according to Claim 18 wherein the indication step comprises indicating that the learning mode of the memory has been entered.

20. A method according to Claim 18 or 19 wherein the indication step comprises indicating when the learning mode of the memory has last been entered.

21. A method according to Claim 18, 19 or 20 wherein the indication step comprises progressively indicating a passage of time since the learning mode has last been entered.

22. A method according to any preceding Claim 17 to 21 wherein the indication step comprises indicating a number of learned remote transmitters (50).

23. A method according to any preceding Claim 17 to 22 wherein the indication step comprises indicating a change in a number of learned remote transmitters (50).

24. A method according to any preceding Claim 17 to 23 wherein the indication step comprises indicating a change in a unique code of learned remote transmitters (50).

25. A method according to any preceding Claim 17 to 24 wherein the indication step comprises operating at the vehicle at least one of a light (31, 36), a visual display (44), a vibration transducer (46), a speech message generator (45), and an audible signal gen-

erator (47).

26. A method according to any preceding Claim 17 to 25 wherein the indication step comprises operating remote from the vehicle at least one of a light (54), a visual display (58), a vibration transducer, a speech message generator (56, 59), and an audible signal generator (59).

27. A method according to any preceding Claim 17 to 26 wherein the activating step comprises activating responsive to at least one of a manually operated switch (20, 27), a vehicle switch (25), and a vehicle sensor (21).

28. A method according to any preceding Claim 17 to 27 wherein the activating step comprises the activating responsive to the remote transmitter (50).

Patentansprüche

1. Fernbedienungssystem (10) für ein Fahrzeug, das es einem Benutzer erlaubt, eine Funktion in Verbindung mit dem Fahrzeug fernzusteuern, umfassend wenigstens einen eindeutig codierten Fernsender (50), einen Empfänger (13) in dem Fahrzeug zum Empfangen eines Signals von dem wenigstens einen eindeutig codierten Fernsender; ein Fernsender-Lernmittel (47), das betriebsmäßig mit dem genannten Empfänger verbunden ist, um einen eindeutigen Code für einen Fernsender während eines vorübergehenden Aufenthaltes in einem Lernmodus zu erlernen, um einen erlernten Fernsender zu definieren, der zum Veranlassen der Ausführung einer Funktion in Verbindung mit dem Fahrzeug in der Lage ist; ein Fernsender-Prüfmittel (49) zum Generieren einer Anzeige in bezug darauf, ob ein neuer eindeutig codierter Fernsender (50) von dem Fernsender-Lernmittel (47) erlernt wurde, wobei das genannte Fernsender-Prüfmittel folgendes umfaßt: Anzeigemittel (30-37, 44-46) zum Generieren der Anzeige in bezug darauf, ob ein neuer eindeutig codierter Fernsender (50) von dem Fernsender-Lernmittel (47) erlernt wurde, und Aktivierungsmittel (20, 21, 27), um zu veranlassen, daß das genannte Fernsender-Prüfmittel (49) die Anzeige erzeugt; dadurch gekennzeichnet, daß das genannte Fernsender-Prüfmittel (49) so ausgestaltet ist, daß es die Anzeige in bezug darauf, ob ein neuer Fernsender (50) von dem Fernsender-Lernmittel (47) erlernt wurde, zu einem vorbestimmten Zeitpunkt nach dem Verlassen des vorübergehend betretenen Lernmodus generiert.

2. Fernbedienungssystem nach Anspruch 1, bei dem das genannte Fernsender-Lernmittel (47) zwischen einem Lernmodus, der das Erlernen eines eindeu-

tigen Codes eines Fernsenders zuläßt, und einem Sicherheitsmodus umschaltbar ist.

3. Fernbedienungssystem nach Anspruch 2, bei dem das genannte Fernsender-Lernmittel (47) ein Fernsender-Löschnittel zum Löschen aller zuvor auf der Basis des Eintritts in den Lernmodus erlernten Fernsender umfaßt.

4. Fernbedienungssystem nach Anspruch 2 oder 3, bei dem das genannte Fernsender-Prüfmittel (49) das in den Lernmodus eingetretene Anzeigemittel zum Anzeigen umfaßt, daß in den Lernmodus des genannten Fernsender-Lernmittels eingetreten wurde.

5. Fernbedienungssystem nach Anspruch 4, bei dem das genannte in den Lernmodus eingetretene Anzeigemittel Zeitgebermittel zum Anzeigen umfaßt, wann zum letzten Mal in den Lernmodus des genannten Fernsender-Lernmittels eingetreten wurde.

6. Fernbedienungssystem nach Anspruch 5, bei dem das genannte Zeitgebermittel ein Mittel zum progressiven Anzeigen des Ablaufs einer Zeitperiode seit dem letzten Eintreten in den Lernmodus umfaßt.

7. Fernbedienungssystem nach einem der vorherigen Ansprüche, bei dem das genannte Fernsender-Prüfmittel (49) ein die Nummer des erlernten Fernsenders anzeigendes Mittel zum Anzeigen einer Anzahl erlernter Fernsender (50) umfaßt.

8. Fernbedienungssystem nach einem der vorherigen Ansprüche, bei dem das genannte Fernsender-Prüfmittel (49) Mittel zur Anzeige einer Änderung des erlernten Fernsenders umfaßt, um eine Änderung der Anzahl erlernter Fernsender (50) anzuzeigen.

9. Fernbedienungssystem nach einem der vorherigen Ansprüche, bei dem das genannte Fernsender-Prüfmittel (49) Mittel zum Anzeigen einer Änderung des erlernten Fernsendercodes umfaßt, um eine Änderung eines eindeutigen Codes erlernter Fernsender (50) anzuzeigen.

10. Fernbedienungssystem nach einem der vorherigen Ansprüche, bei dem das genannte Anzeigemittel Fahrzeuganzeigemittel in Verbindung mit dem Fahrzeug umfaßt; und wobei das genannte Fahrzeuganzeigemittel wenigstens eine der folgenden Komponenten umfaßt: ein Licht (31, 36), eine visuelle Anzeige (44), ein Vibrationsmeßwertgeber (46), ein Sprachmitteilungsgenerator (45) und ein Akustiksignalgenerator (47).

11. Fernbedienungssystem nach einem der vorherigen Ansprüche, bei dem das genannte Anzeigemittel (50) ein ortsfrem von dem Fahrzeug positioniertes Fernanzeigemittel umfaßt; und wobei das genannte Fernanzeigemittel wenigstens eine der folgenden Komponenten umfaßt: ein Licht (54), eine visuelle Anzeige (58), ein Vibrationsmeßwertgeber, ein Sprachmitteilungsgenerator (56, 59) und ein Akustiksignalgenerator (59).

12. Fernbedienungssystem nach einem der vorherigen Ansprüche, bei dem das genannte Aktivierungsmittel ein Fahrzeugaktivierungsmittel in Verbindung mit dem Fahrzeug umfaßt; und wobei das genannte Fahrzeugaktivierungsmittel wenigstens eine der folgenden Komponenten umfaßt: ein manuell betätigter Schalter (20, 27), ein Fahrzeugschalter (25) und ein Fahrzeugsensor (21).

13. Fernbedienungssystem nach einem der vorherigen Ansprüche, bei dem das genannte Aktivierungsmittel ein ortsfrem von dem Fahrzeug befindliches Aktivierungsmittel umfaßt; und wobei das genannte Fernaktivierungsmittel einen Fernsender (50) umfaßt.

14. Fernbedienungssystem nach einem der vorherigen Ansprüche, mit wenigstens einem Fahrzeugsicherheitssensor (22a, 22b, 23-26), und einem Alarm-Controller (11), der zwischen einem aktivierten Modus und einem deaktivierten Modus umschaltbar ist, der auf einen erlernten Fernsender (50) anspricht, wobei der genannte Alarm-Controller im deaktivierten Modus in der Lage ist, einen Alarm zu generieren, der auf den wenigstens einen Fahrzeugsicherheitssensor anspricht.

15. Fernbedienungssystem nach einem der vorherigen Ansprüche, mit einer Mehrzahl von Fahrzeugtürschlössern (82), die zwischen einer verriegelten und einer entriegelten Position beweglich sind; und mit einem Türschloß-Controller (81) zum Bewegen der Fahrzeugtürschlösser zwischen einer verriegelten und einer entriegelten Position als Reaktion auf einen erlernten Fernsender (85).

16. Fernbedienungssystem nach einem der vorherigen Ansprüche, mit einem Fahrzeugmotorstarter (92) und einem Fernstart-Controller (91) zum Betätigen des Fahrzeugmotorstarters, der auf einen erlernten Fernsender (95) anspricht.

17. Verfahren zum Erhöhen der Sicherheit beim Zulassen der Fernsteuerung einer Funktion in Verbindung mit einem Fahrzeug unter Verwendung wenigstens eines eindeutig codierten Fernsenders (50) und eines Empfängers (13) in dem Fahrzeug zum Empfangen eines Signals von dem wenigstens ei-

nen eindeutig codierten Fernsender, umfassend den Schritt des Speicherns eines eindeutigen Codes eines Fernsenders in einem vorübergehend betretenen Lernmodus in einem Speicher (14), um einen erlernten Fernsender zu definieren, der zur Veranlassung der Ausführung einer Funktion in Verbindung mit dem Fahrzeug in der Lage ist, wobei das Verfahren durch den Schritt gekennzeichnet ist, daß geprüft wird, ob ein neuer eindeutig codierter Fernsender (50) in dem Speicher (14) gespeichert wurde, indem die Erzeugung einer Anzeige in Bezug darauf, ob ein neuer eindeutig codierter Fernsender in dem Speicher (14) gespeichert wurde, eine vorbestimmte Zeit nach dem Verlassen des vorübergehend betretenen Lernmodus aktiviert wird, um dadurch den Benutzer auf einen potentiell unbefugten erlernten Fernsender aufmerksam zu machen, der zu einer Fernausführung einer Funktion in Verbindung mit dem Fahrzeug in der Lage ist.

18. Verfahren nach Anspruch 17, bei dem der genannte Speicher (14) zwischen einem Lernmodus, der das Erlernen eines eindeutigen Codes eines Fernsenders (50) zuläßt, und einem Sicherheitsmodus umschaltbar ist, und alle zuvor erlernten Fernsender auf der Basis des Eintritts in den Lernmodus gelöscht werden.

19. Verfahren nach Anspruch 18, bei dem der Anzeigeschritt das Anzeigen umfaßt, daß in den Lernmodus des Speichers eingetreten wurde.

20. Verfahren nach Anspruch 18 oder 19, bei dem der Anzeigeschritt das Anzeigen umfaßt, wann der Lernmodus des Speichers zuletzt betreten wurde.

21. Verfahren nach Anspruch 18, 19 oder 20, bei dem der Anzeigeschritt das progressive Anzeigen des Ablaufs einer Zeitperiode seit dem letzten Eintreten in den Lernmodus umfaßt.

22. Verfahren nach einem der vorherigen Ansprüche 17 bis 21, bei dem der Anzeigeschritt das Anzeigen einer Anzahl erlernter Fernsender (50) umfaßt.

23. Verfahren nach einem der vorherigen Ansprüche 17 bis 22, bei dem der Anzeigeschritt das Anzeigen einer Änderung der Anzahl erlernter Fernsender (50) umfaßt.

24. Verfahren nach einem der vorherigen Ansprüche 17 bis 23, bei dem der Anzeigeschritt das Anzeigen einer Änderung eines eindeutigen Codes erlernter Fernsender (50) anzeigt.

25. Verfahren nach einem der vorherigen Ansprüche 17 bis 24, bei dem der Anzeigeschritt die Betätigung von wenigstens einer der folgenden Komponenten

an dem Fahrzeug umfaßt: ein Licht (31, 36), eine visuelle Anzeige (44), ein Vibrationsmeßwertgeber (46), ein Sprachmitteilungsgenerator (45) und ein Akustiksignalgenerator (47).

5 26. Verfahren nach einem der vorherigen Ansprüche 17 bis 25, bei dem der Anzeigeschritt das von dem Fahrzeug ortsferne Betätigen wenigstens einer der folgenden Komponenten umfaßt: ein Licht (54), eine visuelle Anzeige (58), ein Vibrationsmeßwertgeber, ein Sprachmitteilungsgenerator (56, 59) und ein Akustiksignalgenerator (59).

10 27. Verfahren nach einem der vorherigen Ansprüche 17 bis 26, bei dem der Aktivierungsschritt das Aktivieren als Reaktion auf wenigstens eine der folgenden Komponenten umfaßt: ein manuell betätigter Schalter (20, 27), ein Fahrzeugschalter (25) und ein Fahrzeugsensor (21).

15 28. Verfahren nach einem der vorherigen Ansprüche 17 bis 27, bei dem der Aktivierungsschritt das Aktivieren als Reaktion auf den Fernsender (50) umfaßt.

Revendications

20 1. Un système de télécommande (10) destiné à un véhicule pour permettre à un utilisateur de télécommander une fonction associée au véhicule, englobant au moins un télé-émetteur à code unique (50) ; un récepteur (13) à l'intérieur du véhicule pour recevoir un signal depuis au moins un télé-émetteur à code unique ; des moyens d'apprentissage (47) de télé-émetteurs connectés, pour le fonctionnement, audit récepteur pour l'apprentissage d'un code unique d'un télé-émetteur pendant un mode d'apprentissage saisi temporairement pour définir un télé-émetteur appris capable de causer l'exécution d'une fonction associée au véhicule ; des moyens (49) de vérification de télé-émetteurs pour produire une indication signalant si un nouveau télé-émetteur à code unique (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47), lesdits moyens de vérification de télé-émetteurs englobant des moyens indicateurs (30-37, 44-46) pour produire l'indication signalant si un nouveau télé-émetteur à code unique (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47), et des moyens d'activation (20, 21, 27) pour faire produire ladite indication par lesdits moyens de vérification de télé-émetteurs (49) ; caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

25 2. Système de télécommande (10) selon la revendication 1, caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

30 3. Système de télécommande (10) selon la revendication 1, caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

35 4. Système de télécommande (10) selon la revendication 1, caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

40 5. Système de télécommande (10) selon la revendication 1, caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

45 6. Système de télécommande (10) selon la revendication 1, caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

50 7. Système de télécommande (10) selon la revendication 1, caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

55 8. Système de télécommande (10) selon la revendication 1, caractérisé en ce que lesdits moyens de vérification de télé-émetteurs (49) sont adaptés pour engendrer l'indication signalant si un nouveau télé-émetteur (50) a ou non été appris par les moyens d'apprentissage de télé-émetteurs (47) à un moment prédéterminé après la sortie du mode d'apprentissage.

sage saisi temporairement.

2. Un système de télécommande selon la Revendication 1, dans lequel lesdits moyens d'apprentissage de télé-émetteurs (47) sont commutés entre un mode d'apprentissage qui rend possible l'apprentissage d'un code unique d'un télé-émetteur, et un mode de sécurité.

3. Un système de télécommande selon la Revendication 2, dans lequel lesdits moyens d'apprentissage de télé-émetteurs (47) englobent des moyens d'effacement de télé-émetteurs pour effacer tous les télé-émetteurs précédemment appris basés sur la saisie du mode d'apprentissage.

4. Un système de télécommande selon la Revendication 2 ou 3, dans lequel lesdits moyens de vérification de télé-émetteurs (49) englobent des moyens d'indication de saisie du mode d'apprentissage pour indiquer que le mode d'apprentissage desdits moyens d'apprentissage de télé-émetteurs a été saisi.

5. Un système de télécommande selon la Revendication 4, dans lequel lesdits moyens d'indication de saisie du mode d'apprentissage englobent des moyens d'indication du temps écoulé pour indiquer quand le mode d'apprentissage desdits moyens d'apprentissage de télé-émetteurs a été saisi en dernier.

6. Un système de télécommande selon la Revendication 5, dans lequel lesdits moyens d'indication du temps écoulé englobent des moyens d'indication progressive d'un passage de temps depuis la dernière saisie du mode d'apprentissage.

7. Un système de télécommande selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens de vérification de télé-émetteurs (49) englobent des moyens d'indication du nombre de télé-émetteurs appris pour indiquer un nombre de télé-émetteurs appris (50).

8. Un système de télécommande selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens de vérification de télé-émetteurs (49) englobent des moyens d'indication de changement de télé-émetteurs appris pour indiquer un changement d'un nombre de télé-émetteurs appris (50).

9. Un système de télécommande selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens de vérification de télé-émetteurs englobent des moyens d'indication de changement de codes de télé-émetteurs appris pour indiquer un changement dans un code unique de télé-émetteurs appris (50).

5 10 15 20 25 30 35 40 45 50 55 10 15 20 25 30 35 40 45 50 55

10. Un système de télécommande selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens indicateurs englobent lesdits moyens d'indication de véhicule associés au véhicule ; et dans lequel lesdits moyens indicateurs de véhicule englobent au moins un parmi : une lampe (31, 36), un affichage visuel (44), un transducteur de vibrations (46), un générateur de messages vocaux (45) et un générateur de signaux audibles (47).

11. Un système de télécommande selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens indicateurs (50) englobent des moyens de télé-indication placés à l'écart du véhicule ; et dans lequel lesdits moyens de télé-indication englobent au moins un parmi : une lampe (54), un affichage visuel (58), un transducteur de vibrations, un générateur de messages vocaux (56, 59) et un générateur de signaux audibles (59).

12. Un système de télécommande selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens d'activation englobent des moyens d'activation de véhicule associés au véhicule et dans lequel lesdits moyens d'activation de véhicule englobent au moins un parmi : un commutateur à commande manuelle (20, 27), un commutateur de véhicule (25) et un capteur de véhicule (21).

13. Un système de télécommande selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens d'activation englobent des moyens de télé-activation écartés du véhicule ; et dans lequel lesdits moyens de télé-activation englobent un télé-émetteur (50).

14. Un système de télécommande selon l'une quelconque des revendications précédentes, englobant au moins un capteur de sécurité de véhicule (22a, 22b, 23-26) ; et un contrôleur d'alarme (11) qui peut être commuté entre un mode armé et un mode désarmé et qui réagit à un télé-émetteur appris (50), ledit contrôleur d'alarme pouvant, en mode désarmé, générer une alarme par réaction à au moins un capteur de sécurité de véhicule.

15. Un système de télécommande selon l'une quelconque des revendications précédentes, englobant une pluralité de verrous (82) pour portières de véhicule déplaçables entre une position verrouillée et une position déverrouillée ; et un contrôleur de verrouillage de portières (81) pour déplacer les verrous des portières de véhicule entre des positions verrouillée et déverrouillée, contrôleur qui réagit à un

télé-émetteur appris (85).

16. Un système de télécommande selon l'une quelconque des revendications précédentes, englobant un démarreur de moteur de véhicule (92) ; et un contrôleur de télédémarrage (91) pour actionner le démarreur du moteur de véhicule, ce contrôleur réalisant à un télé-émetteur appris (95).

17. Un procédé pour accroître la sécurité en permettant la télécommande de fonctions associées à un véhicule en utilisant au moins un télé-émetteur à code unique (50), et un récepteur (13) à l'intérieur du véhicule pour recevoir un signal depuis au moins un desdits télé-émetteurs à code unique, englobant l'étape de stockage dans une mémoire (14) d'un code unique d'un télé-émetteur pendant un mode d'apprentissage saisi temporairement pour définir un télé-émetteur appris capable de faire exécuter une fonction associée au véhicule ; le procédé étant caractérisé par l'étape de vérification pour détecter si un nouveau télé-émetteur à code unique (50) a été stocké dans la mémoire (14) en activant la production d'une indication signalant si un télé-émetteur à code unique nouveau a été ou non stocké dans la mémoire (14) à un moment prédéterminé après la sortie du mode d'apprentissage saisi temporairement afin d'alerter l'utilisateur de la présence d'un télé-émetteur appris potentiellement non autorisé capable de télécommander une fonction associée au véhicule.

18. Un procédé selon la Revendication 17, selon lequel ladite mémoire (14) peut commuter entre un mode d'apprentissage, rendant possible l'apprentissage d'un code unique d'un télé-émetteur (50), et un mode de sécurité, et tous les télé-émetteurs précédemment appris sont effacés lors de la saisie du mode d'apprentissage.

19. Un procédé selon la Revendication 18, selon lequel l'étape d'indication englobe l'indication que le mode d'apprentissage de la mémoire a été saisi.

20. Un procédé selon la Revendication 18 ou 19, selon lequel l'étape d'indication englobe l'indication du moment où le mode d'apprentissage de la mémoire a été saisi en dernier.

21. Un procédé selon la Revendication 18, 19 ou 20, selon lequel l'étape d'indication englobe l'indication progressive d'un temps écoulé depuis la dernière saisie du mode d'apprentissage.

22. Un procédé selon l'une quelconque des Revendications 17 à 21, selon lequel l'étape d'indication englobe l'indication d'un nombre de télé-émetteurs appris (50).

5 23. Un procédé selon l'une quelconque des Revendications 17 à 22, selon lequel l'étape d'indication englobe l'indication d'un changement d'un nombre de télé-émetteurs appris (50).

10 24. Un procédé selon l'une quelconque des Revendications 17 à 23, selon lequel l'étape d'indication englobe l'indication d'un changement dans un code unique de télé-émetteurs appris (50).

15 25. Un procédé selon l'une quelconque des Revendications 17 à 24, selon lequel l'étape d'indication englobe le fonctionnement, au niveau du véhicule, d'au moins un parmi une lampe (31, 36), un affichage visuel (44), un transducteur de vibrations (46), un générateur de messages vocaux (45) et un générateur de signaux audibles (47).

20 26. Un procédé selon l'une quelconque des Revendications 17 à 25, selon lequel l'étape d'indication englobe la télécommande, depuis le véhicule, d'au moins un parmi une lampe (54), un affichage visuel (58), un transducteur de vibrations, un générateur de messages vocaux (56, 59) et un générateur de signaux audibles (59).

25 30 27. Un procédé selon l'une quelconque des Revendications 17 à 26, selon lequel l'étape d'activation englobe l'activation en réponse à au moins un parmi : un commutateur à commande manuelle (20, 27), un commutateur de véhicule (25) et un capteur de véhicule (21).

35 28. Un procédé selon l'une quelconque des Revendications 17 à 27, selon lequel l'étape d'activation englobe l'activation en réponse au télé-émetteur (50).

40 45 50 55

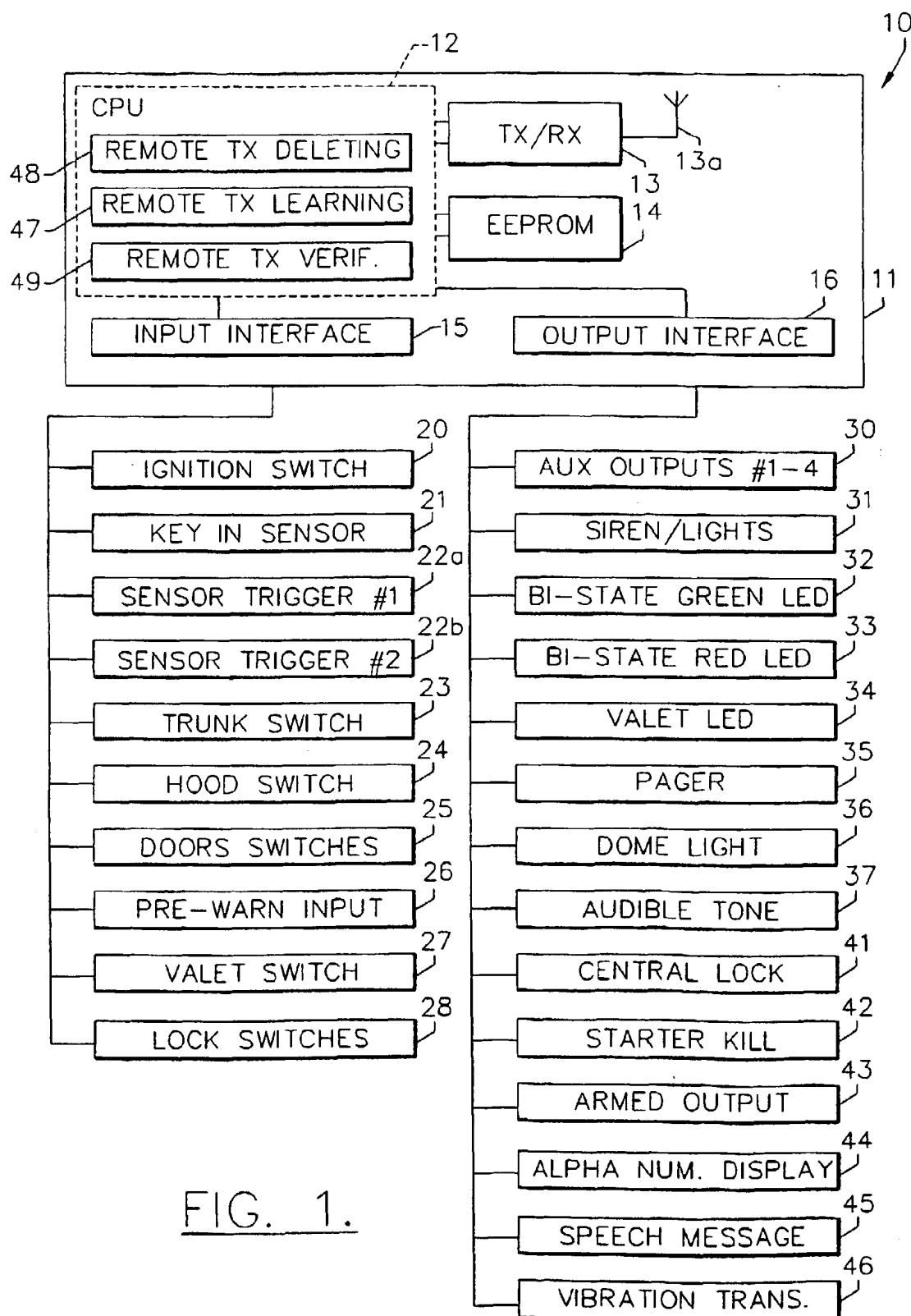


FIG. 1.

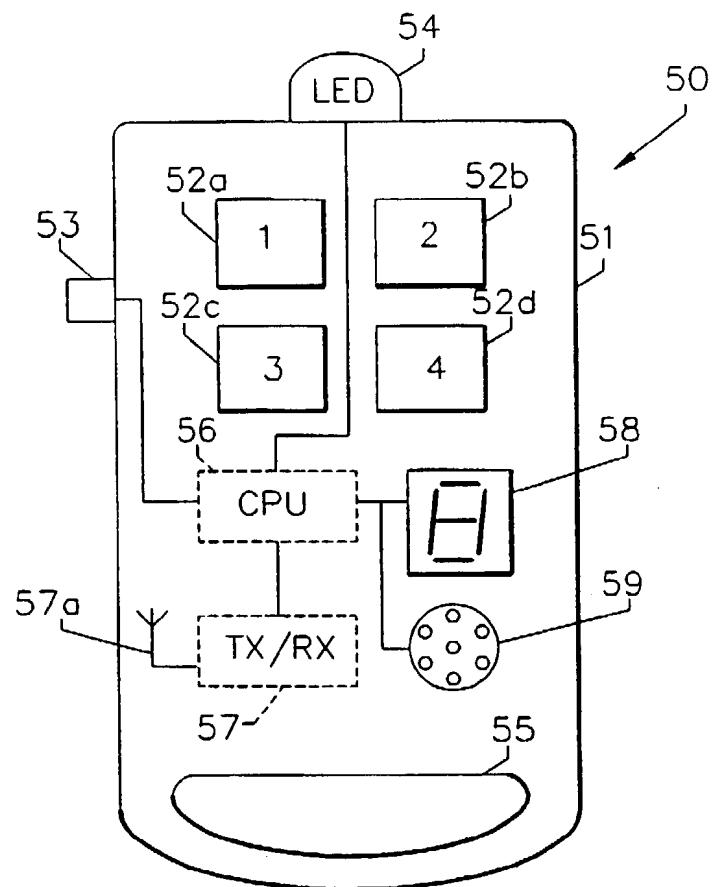


FIG. 2.

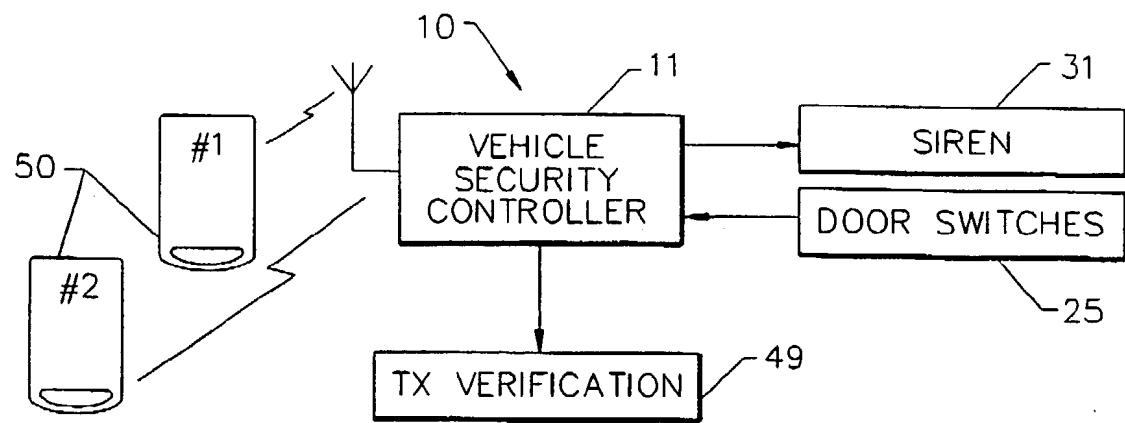


FIG. 3.

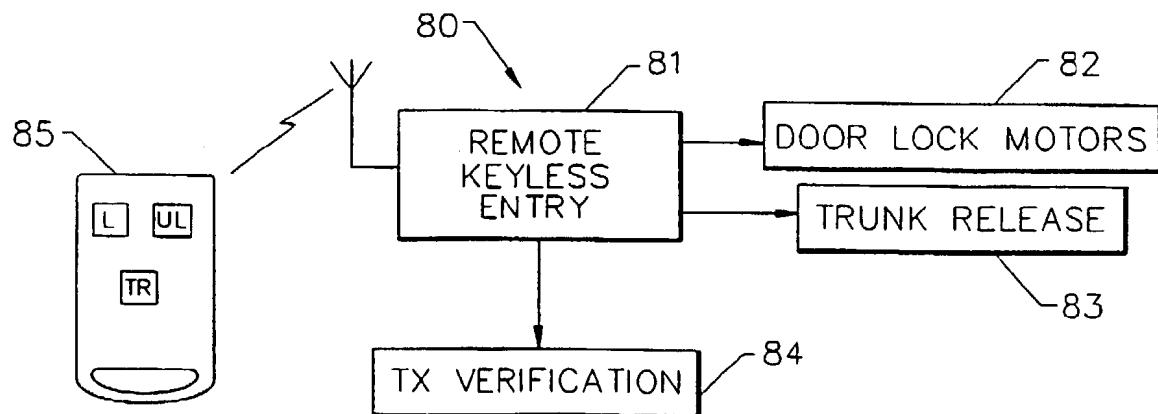


FIG. 4.

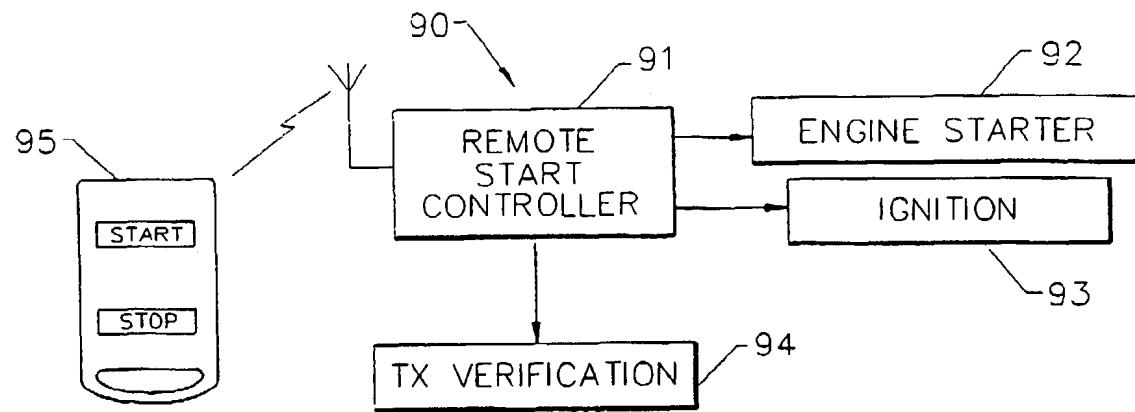


FIG. 5.

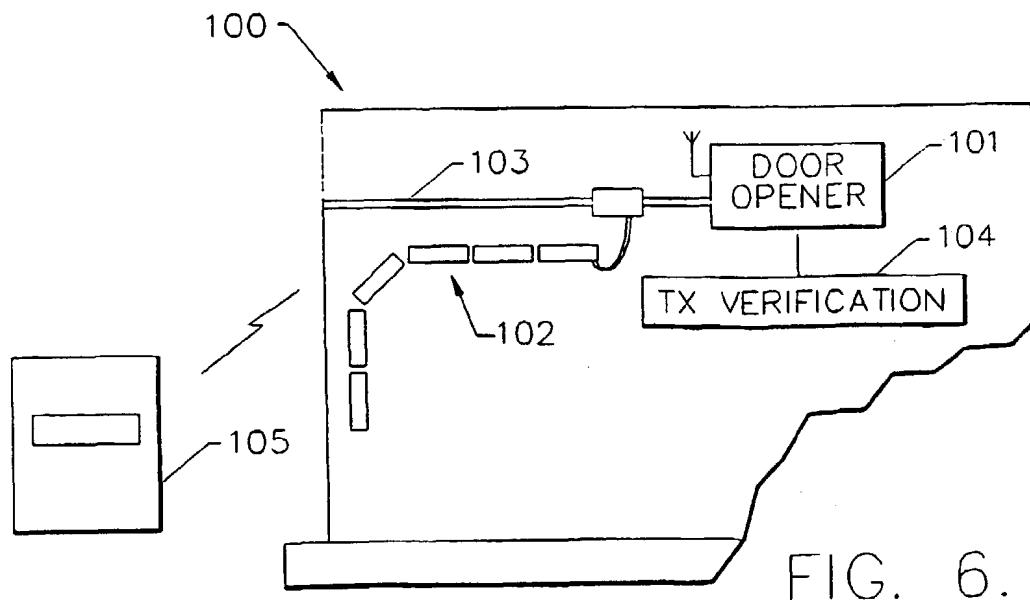


FIG. 6.

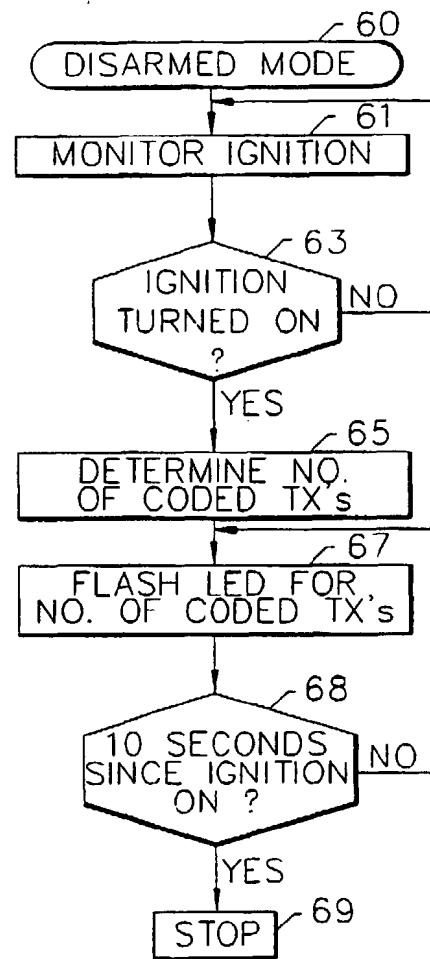


FIG. 7.

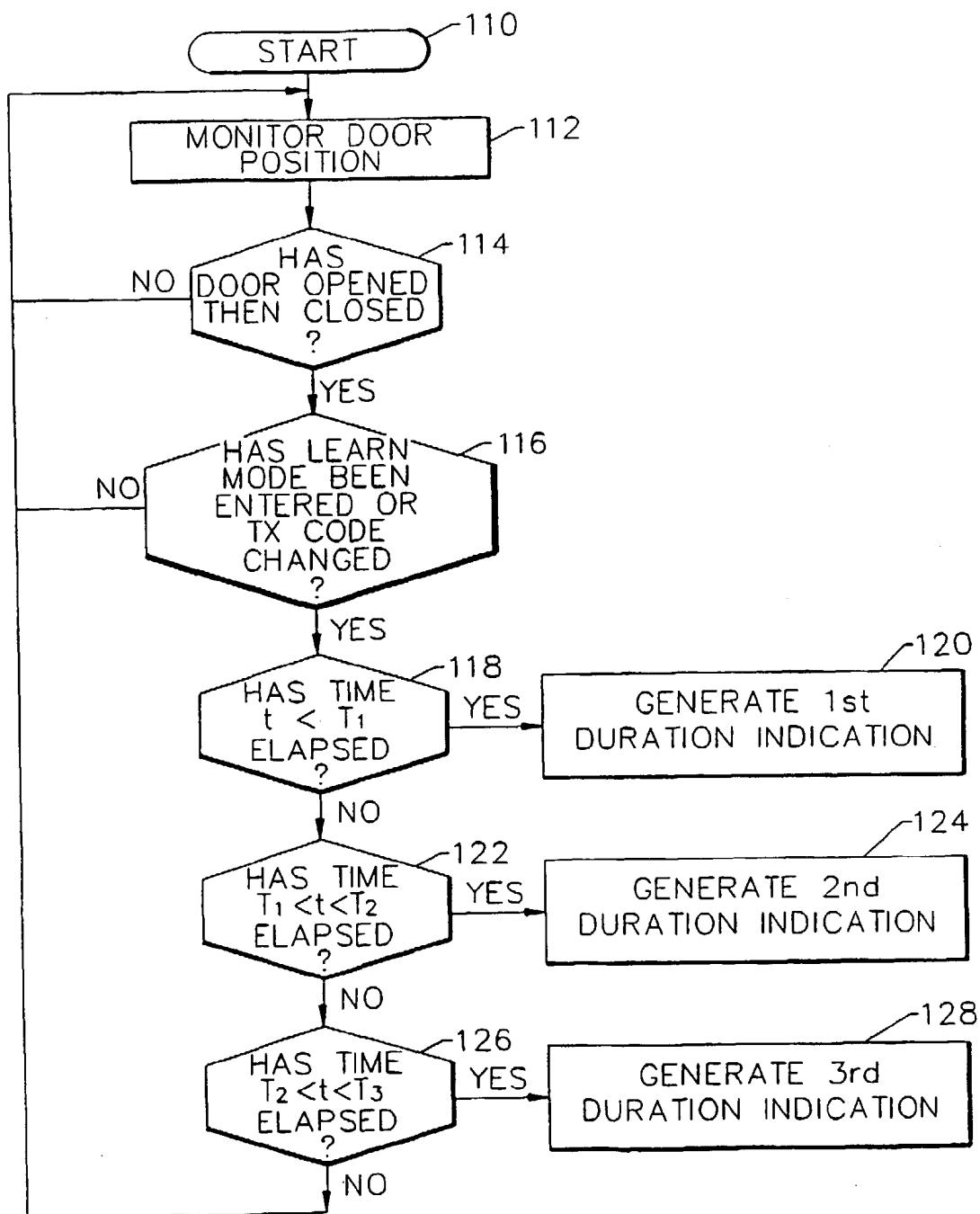


FIG. 8.